

**NEW AND INTERESTING RECORDS OF *OGYRIS ZOSINE*
(HEWITSON, [1853]) (LEPIDOPTERA: LYCAENIDAE) FROM
INLAND WESTERN AUSTRALIA**

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Abstract

The geographical range of *Ogyris zosine* (Hewitson, [1853]) in Western Australia was previously considered to be restricted to the Kimberley and Pilbara regions in the northern and northwestern areas of the state. Here we document several new distribution records from the arid zone of inland central and southern Western Australia (south of the Tropic of Capricorn) that suggest the species' extent of occurrence is considerably broader than previously realised and that it is likely to occupy much of the Eyrean Province where suitable habitat persists. Previous records of the closely related *O. genoveva* (Hewitson, [1853]) from Western Australia are considered to be erroneous.

Introduction

The lycaenid butterfly *Ogyris zosine* (Hewitson, [1853]) in Australia has a broad distribution across the northern half of the continent, occurring sporadically from North West Cape, WA (Williams *et al.* 1992, Williams *et al.* 1997), through the Northern Territory and Queensland to Ballina and Evans Head, NSW (Common and Waterhouse 1981). It has been recorded mainly in the higher rainfall areas of the Australian Monsoon Tropics biome of northern Australia (*i.e.* the Kimberley, Top End, Cape York Peninsula/northern Queensland), but also occurs in the arid zone of central Australia as far south as Alice Springs (Common and Waterhouse 1981) and Hermannsburg Ridge in Finke Gorge (Braby 2000), NT.

In Western Australia, *O. zosine* is well known from the Kimberley in the northern part of the State (*e.g.* Field 1990, Dunn and Dunn 1991, Grund and Hunt 2001, Williams *et al.* 2006, Braby 2011), but there are few records south of the Kimberley. Waterhouse and Lyell (1914) originally listed it from the Pilbara at 'Fortescue R[iver]' as the only known locality from the State at that time. Common and Waterhouse (1981) also recorded the species from the Pilbara – from near Paraburdoo, 70 km S of Tom Price, just north of the Tropic of Capricorn. Williams *et al.* (1992, p. 26) recorded it further west from the coastal areas of North West Cape, noting that 'We have taken ... a further female in worn condition at Milyering, Cape Range National Park, North West Cape, on 7 December 1989. The Milyering specimen was active around a flowering creeper, *Ipomoea yardiensis* A.S. George. Surrounding vegetation was dominated by *Acacia bivenosa* A.P. de Condolle shrubs to 3 m, many of which were parasitised by the mistletoe *Amyema preissii* (Miq.) Tieghem.' Subsequently, Williams *et al.* (1997, p. 46) obtained additional

material from this general location, remarking that 'In late July 1989 we encountered several males on a rocky ridge along the western side of Cape Range (22°14'21"S, 113°51'44"E). Subsequent observations by A.G. Tomlinson have confirmed that the species is not uncommon, and is on the wing until February.' Two males from this locality are deposited in the Australian National Insect Collection, Canberra (ANIC).

Thus, there have hitherto been no records of *O. zosine* from the southern half of Western Australia, south of the Tropic of Capricorn (*c.* 23° latitude). The following records are therefore of considerable interest in clarifying the geographical distribution and extent of occurrence of this species in Western Australia, particularly from the arid inland areas of the state.

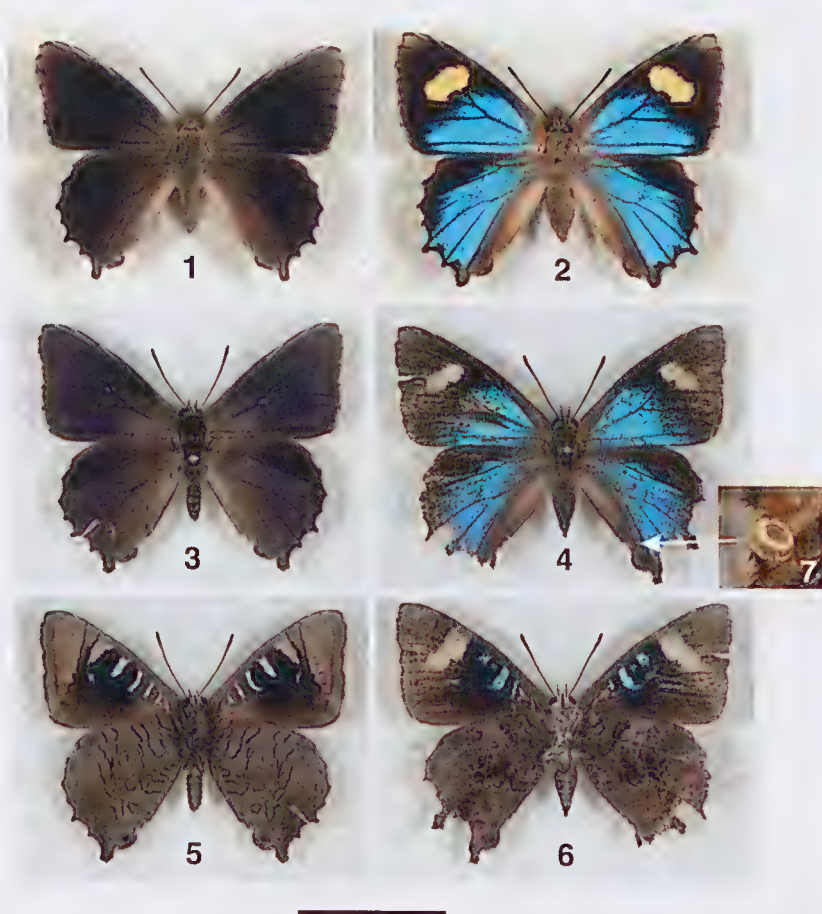
Observations

(1). A male *O. zosine* was observed on the Murchison River Crossing on the Gascoyne Junction-Mullewa Road (27°32'S, 115°47'E) on 13 April 1979 by M. Peterson and M. Powell. The specimen was observed at 1400 h (W.S.T.) for 3-5 mins during sunny and humid conditions flying rapidly 2-4 m above the ground in shrubland dominated by *Acacia tetragonophylla* F.Muell. growing on reddish clay flats on the northern side of the river, about 150 m E of the road. The individual was immediately distinguished from *O. amaryllis* (Hewitson, 1862) and *O. oroetes* (Hewitson, 1862) by its darker purple colouration and from the closely related *O. idmo* (Hewitson, 1862) and *O. subterrestris* Field, 1999 by its flight behaviour.

(2). A male *O. zosine* was collected from 4 km W of Zanthus (~30°47'S, 124°02'E) on 26 January 1987 by M. Golding (R.P. Mayo pers. comm.). The specimen is labelled '4 K W Zanthus, W.A. Hill topping', '26-1-87, M. GOLDING' (preserved in the private collection of R.P. Mayo, Queensland) and was previously misidentified as *O. genoveva* (Hewitson, [1853]) (see Discussion below).

(3). Three or four males of *O. zosine* were observed flying rapidly over rocky slopes at Cardunia Rocks (30°55'42"S, 122°33'35"E), approximately 100 km WSW of Zanthus, on 13 October 1995 (A.A.E. Williams pers. comm.). The specimens evaded capture.

(4-5). At least six males of *O. zosine* were observed hilltopping at Bartlett Bluff, a rocky hill supporting open shrubland about 1 m high, approximately 200 km NNE of Zanthus (29°04'58"S, 124°34'44"E), during a field expedition to the Great Victoria Desert (the Plumridge Lakes Project) on 8 October 2002 (C.R. Crouch pers. comm.). Two voucher specimens were collected, one of which is illustrated in Figures 3 and 5. Subsequently, a female voucher specimen was collected from a campsite located approximately 160 km NE of Zanthus (*c.* 75 km SE of Bartlett Bluff) (29°37'51"S, 125°02'51"E) on 19 October 2002 by A. MacDonald. This



Figs 1-7. *Ogyris zosine* from the Rawlinson Ranges and Great Victoria Desert in inland Western Australia: (1) male upperside, labelled '25.82393°S, 127.94470°E, 2.5 km E. Luehmans Spring, Rawlinson R., WA, emg. 14 SEP. 2010, MF Braby & J Armstrong', 'Reared from larva on *Amyema sanguinea*, coll. 11 AUG. 2010', 'MFBC 00705, M.F. Braby Collection' (ANIC), DNA voucher 'MFB-10-P062' (Griffith University, QLD); (2) female upperside, labelled similarly but with date 'emg. 9 SEP. 2010' (ANIC) and DNA voucher 'MFB-10-P055' (Griffith University, QLD); (3, 5) male upper- and underside, labelled 'Bartlett Bluff, Great Victoria Desert, W. Aust., 8 Oct. 2002, C.R. Crouch.' (Fabian Douglas Collection, Victoria (FDC)); (4, 6) female upper- and underside, labelled 'c.75 km SE of Bartlett Bluff, Great Victoria Desert, W.A., 19 Oct. 2002, A. MacDonald' (FDC); (7) egg on dorsal wing surface of female specimen. Scale bar = 20 mm.

specimen (Figs 4, 6) was collected in a most unorthodox manner; it landed on MacDonald's body to imbibe the perspiration on his skin, first settling on his nose and then on his leg, from where it was collected with a glass jar. The specimen was kept inside the jar but before death it laid an egg, which was attached to the dorsal surface of the inner margin of the right hind wing. The egg was apparently fertile as revealed by a larval exit hole at its apex (Fig. 7).

(6-7). Breeding colonies of *O. zosine* were recorded at two locations in the Ngaanyatjarra Indigenous Protected Area in the arid zone of central Western Australia: (1) 2.5 km E of Luehmans Spring, Rawlinson Ranges (25.82393°S, 127.94470°E) on 11 August 2010; and (2) at Gill Pinnacle, Schwerin Mural Crescent (24.89153°S, 128.76907°E) on 13 August 2010 by M.F. Braby and J. Armstrong (Braby 2010). At both locations the butterfly was found breeding on *Amyema sanguinea* (F.Muell.) Danser. (Loranthaceae) parasitising eucalypts growing in low open woodland on steep rocky slopes with a west facing aspect. Near Luehmans Spring, 15 larvae and six pupae were recorded in small groups above the gorge; the early stages were attended by numerous black-coloured sugar ants *Camponotus feldae* Forel, 1902 and were either in concealed areas at the base of the host tree or associated with the larval food plant under loose bark or inside holes of wood boring insects within the haustorium. At this location, a large cluster of eggs was also collected from a hollowed chamber inside the haustorium and a female was observed during the mid-afternoon settled on a mistletoe clump. Two reared examples are illustrated in Figures 1 and 2. At Gill Pinnacle, a final instar larva was collected from inside a large wood boring insect hole within the mistletoe haustorium; however, on this occasion the larva was not attended by ants and was sheltering together with several larvae of *O. amaryllis*. Seventeen adults (6 ♂♂, 11 ♀♀) were reared from these materials.

(8). A female *O. zosine* in near perfect condition (*i.e.* with minimal scale loss) was recorded approximately 2 km N of Wheelarra Hill, 40 km SE of Newman (23°21.541'S, 120°07.670'E; 560 m a.s.l.) on 30 May 2011 by M. Peterson. The individual was observed and photographed on the flowers of *Grevillea wickhamii* Meisn (Proteaceae) during the afternoon (1458-1500 h W.S.T.) two metres above the ground, within several metres of a creek comprising *Corymbia* sp., *Acacia* sp. and *Grevillea wickhamii*, with an understorey of *Triodia* sp. and riverine grasses on red-brown clay-sand.

These eight new spatial records of *O. zosine* from central and southern Western Australia (south of the Tropic of Capricorn), together with those from the Pilbara and North West Cape, are shown in Figure 8.

The three male specimens from the southern edge of the Great Victoria Desert are relatively small in size, with their wingspans measuring approximately 39-40 mm. These specimens have the upperside ground colour iridescent dark purple, but not as rich violet-purple as in the closely

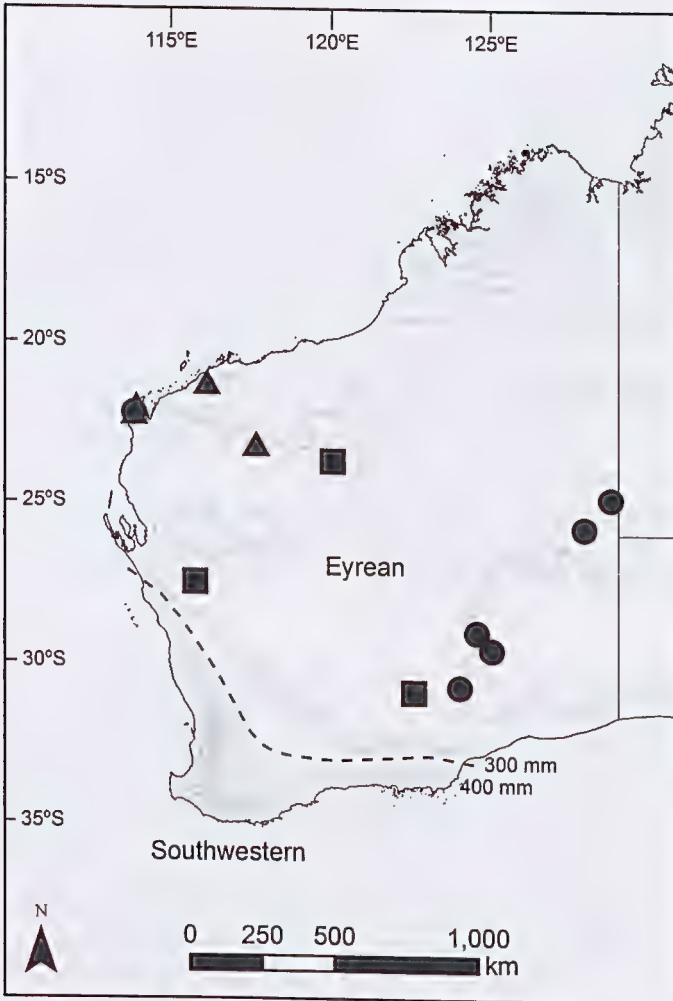


Figure 8. Distribution records of *Ogyris zosine* in Western Australia, south of the Kimberley (● vouchered specimens, ■ field observations, ▲ scientific literature). Annual rainfall isohyets (grey lines) indicate 100 mm contours. Dashed line indicates approximate boundary between the Southwestern and Eyrean Provinces.

related *O. genoveva* (Hewitson, [1853]). The intensity of the colour is similar to material reared from the Rawlinson Ranges (Fig. 1) and examined in the ANIC from North West Cape collected by M.R. Williams.

The female specimen from the Great Victoria Desert (Figs 4, 6) is also comparatively small (wingspan 42 mm) and is similar to material reared from the Rawlinson Ranges (Fig. 2). Females from these two locations have the upperside basal areas iridescent pale blue (rather than the greenish blue or bluish green typical of *O. genoveva*) and more extensive, reaching the subterminal area of the forewing and the termen of the hind wing. The shape of the basal iridescent blue area on the forewing is, however, more reminiscent of *O. genoveva* in that the distal margin is relatively straight; however, the blue area is far more extensive, occupying much of the discal cell, the base of cell CuA_2 and more than two-thirds of cell $1A+2A$. The cream postmedian patch of the forewing of these specimens is comparatively small, a characteristic feature of *O. zosine*. In *O. zosine* females, the terminal lobe at end of vein M_3 on the hind wing is generally less pronounced than that of *O. genoveva* females; however, the specimen from near Zanthus is too damaged to make a clear comparison of this character.

In all specimens of both sexes, the shape of the hind wing is comparatively narrower and longer with the tornus more produced than in *O. genoveva*, which typically has the wing broader and termen more rounded than in *O. zosine*.

Discussion

The locality records of *Ogyris zosine* from inland Western Australia, especially those from the edge of the Great Victoria Desert and Nullarbor Plain, are of particular interest on several accounts. First, they represent a substantial extension to the known range of the species – the locations near Zanthus (4 km W of and Cardunia Rocks), for example, are situated more than 1,300 km from those at North West Cape and define the southern limit of the species in Western Australia. Second, they represent the first documented occurrence of the species in the temperate region of arid southern Australia. All of these records lie within the arid zone (Eyrean Province) in which the mean annual rainfall is less than 300 mm and none occurs in the more mesic areas of the Southwestern Province (Fig. 8). The boundary between these two faunal subregions, which stretches from near Kalbarri in the north to Israelite Bay in the east, is demarcated approximately by the 300-400 mm annual rainfall isohyets (Heatwole 1987). In contrast, the closely related *O. idmo* (Hewitson, 1862) and *O. otares* (C. & R. Felder, 1865) in Western Australia are restricted to the higher rainfall areas of coastal and near coastal areas of the Southwestern Province (see distribution maps in Schmidt *et al.* 2014) and are thus allopatric with *O. zosine*.

In discussing the distribution of *O. genoveva*, the sister species of *O. zosine*, Burns and Rotherham (1969, p. 96) stated that 'Recently the writer was shown a female specimen [of this species] from Western Australia'. Braby (2000, p. 708) subsequently noted that in Western Australia *O. genoveva* had been recorded from the southeastern edge of the Great Victoria Desert: 'in January 1987 a male was captured whilst feeding at blossom four kilometres west of Zanthus (M. Golding).' Apart from these anomalous records, *O. genoveva* is otherwise known only from the dry temperate woodlands of southeastern and eastern Australia. Examination of digital photographs of the male specimen from near Zanthus indicated that it is actually *O. zosine* and closely matches the two males from Bartlett Bluff, 200 km NNE of Zanthus, although in this specimen the upperside colour is brighter purple but not the bluish-purple typical of *O. genoveva*. It is therefore very likely that the record of *O. genoveva* referred to by Burns and Rotherham (1969) is also *O. zosine*.

Available spatial data suggests *O. zosine* is considerably more widespread in Western Australia than previously realised (Fig. 8). Moreover, given that the Eyrean Province occupies much of inland Australia, it seems likely that *O. zosine* may be distributed throughout the arid zone of inland central and southern Western Australia where suitable habitat persists. It remains to be determined if the species also occurs in the arid areas of northwestern South Australia since this area now lies well within the geographical range of *O. zosine*.

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